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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 066463

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

TEA-BAG OPERATOR (coffee, tea, and sp.) 7-68.910

B-581 S-301

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U. S. Employment Service
in Cooperation with
Texas State Employment Service

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GATB # 2499

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

TEA-BAG OPERATOR (coffee, tea, and sp.) 7-68.910

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Summary

The General Aptitude Test Battery, B-1002A was administered to a final sample of 56 females employed as Tea-Bag Operator 7-68.910 at Lipton Tea Company, Galveston, Texas. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes G-Intelligence, F-Finger Dexterity and M-Manual Dexterity were selected for inclusion in the final test norms.

GATB Norms for Tea-Bag Operator 7-68.910, B-581 S-301

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	85	G	Part 3 Part 4 Part 6	80
F	CB-1-O CB-1-P	85	F	Part 11 Part 12	80
M	CB-1-M CB-1-N	95	M	Part 9 Part 10	90

Effectiveness of Norms

The data in Table IV indicate that only 70 percent of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 85 percent would have been good workers. 30 percent of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 15 percent would have been poor workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Tea-Bag Operator 7-68.910.

II. Sample

The GATB, B-1002A was administered during October 1960 to 94 women employed as Tea-Bag Operator 7-68.910 at Lipton Tea Company, Galveston, Texas. Of those tested, 38 were eliminated from the final sample because they were assigned to machines and operations where the work performed was not comparable to that of Tea-Bag Operator. Therefore, the final sample consists of 56 Tea-Bag Operators. Three weeks is the average time for a worker to become proficient on the job. All workers in the sample had at least 9 months of on-the-job experience.

No restrictions as to age, education or previous experience were specified for employment, but some individuals in the sample were selected for employment on the basis of USES aptitude test battery B-247 (K-95 and F-75: GATB, B-1002) for Tea-Bag Packer 9-68.30.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 56	M	σ	Range	r
Age (years)	34.1	6.6	20-49	.102
Education (years)	10.6	1.8	5-12	-.047
Experience (months)	63.4	30.4	9-110	.326*

*Significant at the .05 level

III. Job Description

Job Title: Tea-Bag Operator (coffee, tea, and sp.) 7-68.910

Job Summary: Tends two identical, automatic packaging machines to fill, wrap, seal, tag, and staple tea bag envelopes, and to count and pack them in boxes in units of 8, 16, 24, 48, or 100 tea bags as specified.

Work Performed: Affixes rolls of filter paper, envelope paper, and wires on spindles. Threads papers and wire through machine mechanisms. Pushes and pulls on hand lever to operate machine manually and to assure that materials are feeding through mechanisms as required. Presses button switch or pulls levers to start and stop machine, which automatically folds filter paper in prescribed form, inserts measured amounts of tea, attaches string and tab, forms envelope, inserts tea bag into envelope, and closes envelope with staple. The machine is also equipped with lever mechanisms which automatically measure (count) the prescribed number of filled tea-bag envelopes and inserts them into boxes fed from a conveyor. Observes the quantity of wire and each type of paper remaining on roll during progress of operation, and positions new rolls near machine to reduce the amount of down time required to replace rolls. Watches closely for wire or paper to play out on roll. Stops machine and replaces roll. Records down time on operating report under appropriate pre-coded reason. Observes panel board for red lights indicating malfunction of concealed mechanisms such as envelope processing linkages, dosage wheel which measures required amounts of tea, and crimping wheel which seals edges of envelope. Constantly inspects flow of materials through each machine mechanism on two machines to detect defects in product, such as open edges, misalligned corners, staples omitted, torn or folded paper, indicating malfunction of machine. Moves red flag at work station to notify mechanic of need for major adjustments, utilizing experience in type of malfunction to recognize that machine is out of adjustment. Stops machine and removes defective product manually. Operates machine manually to verify required working condition. Makes minor adjustments to machine, such as rethreading broken wire and straightening defective dividers. Starts machine in automatic operation and records amount and reason for down time. Cleans machines and work area using broom and air hose. Trains new operators.

IV. Experimental Battery

All the tests of the GATB, B-1002A , were administered to the sample group.

V. Criterion

The criterion data was collected during the period 1961 through 1963 and consisted of two sets of independent ratings made by the supervisor on USES Form SP-21, "Descriptive Rating Scale." The rating scale consisted of nine items covering different aspects of job performance, with five alternatives for each item. Weights of one through five, indicating the degree of job proficiency attained, were assigned to the alternatives. A reliability coefficient of .79 was obtained for the criterion. Therefore, the two sets of ratings were combined resulting in a distribution of final criterion scores of 50-87 with a mean of 68.4 and a standard deviation of 10.7.

VI Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Intelligence (G) - required for mental alertness in order to anticipate minor machine repair and/or adjustments at the proper time; to acquire sufficient knowledge of the processes for instructing new operators.

Form Perception (P) - required to inspect flow of materials through each machine mechanism and to detect defects in finished product.

Motor Coordination (K) - required to thread materials into machine and to make minor adjustments while two machines are in operation.

Finger Dexterity (F) - required to make adjustments rapidly and accurately and to rethread broken wire using fingers and tweezers.

Manual Dexterity (M) - required to make minor repairs on machine, to remove defective products, and to operate machine manually.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 56

Aptitudes	M	σ	r
G-Intelligence	89.2	13.8	.276*
V-Verbal Aptitude	92.0	15.2	.250
N-Numerical Aptitude	84.1	14.2	.176
S-Spatial Aptitude	92.0	16.8	.239
P-Form Perception	97.4	17.6	.190
Q-Clerical Perception	95.7	14.4	.150
K-Motor Coordination	104.3	16.4	.016
F-Finger Dexterity	104.1	15.2	.211
M-Manual Dexterity	116.8	16.6	.088

*Significant at the .05 level

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X				X		X	X	X
Irrelevant									
Relatively High Mean							X	X	X
Relatively Low Sigma	X		X			X			
Significant Correlation with Criterion	X								
Aptitudes to be Considered for Trial Norms	G						K	F	M

Trial norms consisting of various combinations of Aptitudes G, K, F and M with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of G-80, F-80 and M-90 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 30 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes G, F and M with critical scores of 80, 80 and 90, respectively, and the dichotomized criterion for Tea-Bag Operator 7-68.910. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Tea-Bag Operator 7-68.910
(G-80, F-80, M-90)

N = 56	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	4	35	39
Poor Workers	11	6	17
Total	15	41	56

Phi Coefficient = .56

χ^2 = 17.864

P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, F and M with minimum scores of 80, 80 and 90, respectively, have been established as B-1002 norms for Tea-Bag Operator 7-68.910. The equivalent B-1001 norms consist of G-85, F-85 and M-95.

IX. Determination of Occupational Aptitude Pattern

The data for this study met the requirements for incorporating the occupation studied into OAP-22 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962.